

## Database Design and Operation

As mentioned above, the database 40 may be implemented with a variety of devices such as a conventional database program specially configured to store and organize the data generated by the invention.

5 The preferred implementation of the database 40 is shown as database 400 in Figures 11-15.

Figure 11 is a high-level data relationship diagram illustrating the preferred inventive database 400. As shown therein, the database 400 includes a variety of data entities having functional data relationships with other data entities. As is known in the art, 10 the data entities are storage containers or tables for each of the respective data subjects and may contain a number of fields to store distinct information items. Moreover and as further described below in relation to Figures 12-15, many of the data entities shown in the high-level diagram of Figure 11 may represent a collection of other data entities and associated data relationships.

15 The functional data relationships shown in Figures 11-15 are designated by dark lines terminated by large dots. As is also known in the art, such functional data relationships may be implemented by, for example, designating keys (e.g. primary key, foreign key, etc) and linking key pairs. Furthermore, the data relationships may be one-to-one, one-to-many, or many-to-many.

20 Returning to Fig. 11, the design of database 400 includes four main data entities: the product table 410, the result table 430, the process table 450, and the equipment command & communication table 500. The major data associations relate the product table 410 to the

result table 430; and the result table 430 to the process table 450; and the result table 430 to the equipment command & communication table 500.

Due to advantageous many-to-many data relationships several additional tables or maps may be utilized as further shown in Fig. 11. More specifically, a product-result map 420 relates the product table 410 to the result table 430. Likewise, a process-result map 440 relates the result table 430 to the process table 450. In addition, the product-result map 420 also relates the result table 430 to the test criteria table 460.

Details of each table will now be described along with the associated functionality and general application of the database 400.

The equipment command & communication table 500 of Fig. 11 may include the data entities and data relationships shown in Fig. 12: equipment table 520 is associated with command table 540 which, in turn, is associated with parsing table 560. The parsing table 560 is also associated with the result table 430.

Generally speaking the equipment command & communication table 500 permits the AMS controller 100 to send commands to, receive data from and otherwise communicate with various different types of test and communication equipment including the variety of test equipment 25 and the respective communication interface equipment (e.g. the communication server 55, Ethernet box 70, etc.). Each type of test and communication equipment may expect a different protocol, command, syntax, line rate, etc depending upon the equipment brand, model, release, etc. One of the key advantages of the inventive system is the ability to easily communicate with any such equipment and the database 400 facilitates such communication by providing the appropriate protocols, syntax, commands, etc for the particular type of equipment being utilized.

More specifically, the equipment table 520 may include the following information items or fields: equipment brand identifier, equipment brand name, equipment type identifier, equipment type description and other information items that are used to uniquely identify each piece of test and communication equipment.

5 The command table 540 may include various information items to map the specifically identified equipment to a specific command string that would be proper for that equipment. For example, the command table 540 may include an equipment command identifier, equipment brand identifier (ID), command ID, command string, and command string description. An important concept embodied by the command table 540 and its  
10 relationship to the equipment table 520 is that they permit the AMS controller 100 to correctly retrieve the appropriate command string for a specific type of equipment (e.g. test, communication or module under test). In this way, a generic command may be translated to an equipment-specific command.

Even more specifically and as shown in Fig. 13, the equipment table 520 may  
15 include the following data entities: a equipment brand data entity 522, equipment type data entity 524 (optional particularly if the each brand has only one type), and the equipment usage data entity 526 each of which may include fields for ID, name and description (e.g. brand data entity 522 has an equipment brand ID which may be used as a key, equipment brand name and equipment brand description fields). Equipment brand entity 522 is  
20 associated with equipment type data entity 524 in order to positively identify the equipment. The usage data entity 526 keeps track of how much each piece of equipment is used and may also track which operator used the equipment, when, for how long, etc. Such usage